UNITED STATES PATENT AND TRADEMARK OFFICE

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2172	

16

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Please find below and/or attached an Office communication concerning this application or proceeding.

	Application N		Applicant(s)
Office Action Summary	09/755,503		MILLER ET AL.
	Examiner		Art Unit
	HUNG Q PHAM		2172

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 February 2004*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34, 36-50, 53-65, 67-68 and 71* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-34,36-50,53-65,67,68 and 71* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date *14*.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1.   Applicant's arguments with respect to claims 1, 17, 33, 49 and 65 have

been considered but are moot in view of the new ground(s) of rejection.

Information Disclosure Statement

The information disclosure statement filed 02/26/2004 fails to comply with the

provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because some of the legal copies of

the publication were not provided (the ones that have a drawn line through the citation).

It has been placed in the application file, but the information referred to therein has not

been considered as to the merits. Applicant is advised that the date of any re-

submission of any item of information contained in this information disclosure statement

or the submission of any missing element(s) will be the date of submission for purposes

of determining compliance with the requirements based on the time of filing the

statement, including all certification requirements for statements under 37 CFR 1.97(e).

See MPEP § 609 ¶ C(1).

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for

all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of

the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g)

prior art under 35 U.S.C. 103(a).

3.   **Claims 1-4, 6-9, 11-12, 14-20, 22-25, 27-28, 30, 32-34, 36, 38-41, 43-44,**

46, 48-50, 54-57, 59 and 61-63 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Billheimer et al. [USP 6,611,825 B1].

Regarding to claims 1 and 17, Billheimer teaches a method, a system, and

computer readable medium for representing a document collection (Col. 4, lines 35-48).

As shown in FIG. 2 is *an image device configured to provide a visual image; and digital*

processing circuitry coupled with the image device (Col. 8, line 49-Col. 9, line 6). As shown in FIG. 9, a query can be treated as a document, and projected into the same subspace. The distances between the query and other documents are measured by using the cosine measure, for example, to determine the best matches. At block 220 where a query frequency vector is computed by tokenizing the query and applying term normalization and stemming policies that were used on the original collection (Col. 14, Lines 12-22). The terms are tokenized according to a tokenizing policy, e.g., sequences of letters, letters and numbers, or letters, numbers and certain punctuation like hyphens or slashes, whatever is needed to capture the important terms in the particular domain or the application (Col. 10, Lines 8-12). As seen, a query with a plurality of terms is projected for tokenizing to identify the features such as sequences of letters, letters and numbers, or letters, numbers and certain punctuation like hyphens or slashes in order to apply term normalization and stemming policies for comparing with the documents in documents collection 110 of FIG. 3. In other words, the technique of projecting the query and tokenizing performs the claimed *inputting a plurality of query objects into a data processor*; and *identifying features within each of the plurality of query objects that allow comparison to items of a body of data stored in a database*. Returning to FIG. 9, the similarity is determined by measuring the distance between the query and the documents by using the cosine (Col. 14, lines 28-31). As shown in FIG. 15 is the results of a query for the term Apache. For this query, only Document A, C, and E have non-zero scores. Therefore, only these three documents are returned (Col. 17, Lines 35-41). As shown in FIG. 20 is an example of a query with three terms module, fuselage,

and *pounds*. As seen, the similarity as the relative relationships between each term as query object and the documents of the document collection is determined. In different word, the technique as discussed performs the step of *determining relative relationships between each of the plurality of query objects and the items of the body of data*. As shown in FIG. 11, in order to visualize the mining technique, the axes that correspond to a query is generated as user request (Col. 14, line 57-Col. 16, line 3). Assuming the user entered *module, fuselage,* and *pounds* as choices for the positive direction of the axes (Col. 18, lines 11-27), the scatterplot visualization as in FIG. 20 performs the claimed *displaying points along a plurality of rays, wherein a position of each of the displayed points corresponds to the determined relative relationship between each respective one of the plurality of query objects and the body of data, wherein a ray is provided for each query object.* Billheimer does not explicitly teach the step of *displaying a point representing a specific one of the items at a first position along one of the rays, which position indicates a determined relative relationship between the item and the ray's query object, and displaying a second point representing the same specific item at a second position along another one of the rays, which second position indicates a determined relative relationship between the item and the second ray's query object.* However, by using the technique of visualizing as discussed above with two queries apache and rotorcraft with a document collection of FIG. 15, two rays will be provided for apache and rotorcraft and similar to FIG. 20. Obviously, there will be two points represent document A, one will along the apache ray at a position based on cosine distance, and a another point along rotorcraft ray also based on cosine distance. These two points represent document A, and two rays represent two queries with the

similarity based on cosine distance as discussed indicate the step of *displaying a point representing a specific one of the items at a first position along one of the rays, which position indicates a determined relative relationship between the item and the ray's query object, and displaying a second point representing the same specific item at a second position along another one of the rays, which second position indicates a determined relative relationship between the item and the second ray's query object.* It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Billheimer technique by displaying two points represent for the same item at two different rays for two queries in order to represent a result of two different query terms contain in the same document.

Regarding to claim 33, Billheimer teaches a method, a system, and computer readable medium for representing a document collection (Col. 4, lines 35-48). Billheimer teaches a method, a system, and computer readable medium for representing a document collection (Col. 4, lines 35-48). As shown in FIG. 9, a query can be treated as a document, and projected into the same subspace. The distances between the query and other documents are measured by using the cosine measure, for example, to determine the best matches. At block 220 where a query frequency vector is computed by tokenizing the query and applying term normalization and stemming policies that were used on the original collection (Col. 14, Lines 12-22). The terms are tokenized according to a tokenizing policy, e.g., sequences of letters, letters and numbers, or letters, numbers and certain punctuation like hyphens or slashes, whatever is needed to

capture the important terms in the particular domain or the application (Col. 10, Lines 8-12). As seen, a query with a plurality of terms is projected for tokenizing to identify the features such as sequences of letters, letters and numbers, or letters, numbers and certain punctuation like hyphens or slashes in order to apply term normalization and stemming policies for comparing with the documents in documents collection 110 of FIG. 3. In other words, the technique of projecting the query and tokenizing performs the claimed *identifying features within each of the plurality of query objects that allow comparison to a body of data stored in a database*. The logic then moves to block 226 where the similarity as *relative relationships* is determined by measuring the distance between the query and the documents by using the cosine (Col. 14, lines 28-31) as the step of *determining relative relationships between each of the plurality of query objects and the body of data*. The top ranked documents in terms of closeness are then returned as best matches to the query (Col. 14, lines 31-34). As shown in FIG. 11, in order to visualize the mining technique, the axes that correspond to a query is generated as user request (Col. 14, line 57-Col. 16, line 3). Assuming the user entered `module`, `fuselage`, and `pounds` as choices for the positive direction of the axes (Col. 18, lines 11-27), a legend is generated for the axes. The legend consists of one or more words attached to one or both directions of the dimension. This indicates to the user that documents near one end of the dimension tend to contain the words at that end or words correlated with those words in the document set (Col. 15, lines 52-59). As shown in FIG. 20 is example of visualization with a plurality of projected points corresponding to documents with three rays `module`, `fuselage`, and `pounds` corresponding to the

queries, wherein the documents near the end of the ray tend to contain the query word

based on the similarity as *relative relationships* determined by measuring the distance

between the query and the documents. In other words, the technique as discussed

performs the claimed *control an image device to depict points corresponding to data from the*

database along each of a plurality of rays, wherein positions of the displayed points

correspond to the relative relationships. Billheimer does not explicitly teach the technique

of *displaying at least a majority of the plurality of rays to have a common origin.* However,

as disclosed in FIG. 20, if a user decided to create a three-dimensional scatterplot

visualization in the document set, the user would be prompted to enter a term or a set of

terms for each axis to be used to construct the scatterplot (Col. 18, lines 11-17). As

seen, a three dimensional space is displayed, obviously, has *a common origin* for three

axes as *a majority of the plurality of rays* by default. Therefore, it would have been

obvious for one of ordinary skill in the art at the time the invention was made to include

a common origin for a plurality of axes in order to visualize a set of queries and the

retrieved document in a three dimensional space.

        Regarding to claim 49, Billheimer teaches a method, a system, and computer

readable medium for representing a document collection (Col. 4, lines 35-48). Billheimer

teaches a method, a system, and computer readable medium for representing a

document collection (Col. 4, lines 35-48). As shown in FIG. 9, a query can be treated as

a document, and projected into the same subspace. The distances between the query

and other documents are measured by using the cosine measure, for example, to

determine the best matches. At block 220 where a query frequency vector is computed

by tokenizing the query and applying term normalization and stemming policies that

were used on the original collection (Col. 14, Lines 12-22). The terms are tokenized

according to a tokenizing policy, e.g., sequences of letters, letters and numbers, or

letters, numbers and certain punctuation like hyphens or slashes, whatever is needed to

capture the important terms in the particular domain or the application (Col. 10, Lines 8-

12). As seen, a query with a plurality of terms is projected for tokenizing to identify the

features such as sequences of letters, letters and numbers, or letters, numbers and

certain punctuation like hyphens or slashes in order to apply term normalization and

stemming policies for comparing with the documents in documents collection 110 of

FIG. 3. In other words, the technique of projecting the query and tokenizing performs

the claimed *identifying features within each of the plurality of query objects that allow*

comparison to a body of data stored in a database. The logic then moves to block 226

where the similarity as *relative relationships* is determined by measuring the distance

between the query and the documents by using the cosine (Col. 14, lines 28-31) as the

step of *determining relative relationships between each of the plurality of query objects and*

the body of data. The top ranked documents in terms of closeness are then returned as

best matches to the query (Col. 14, lines 31-34). As shown in FIG. 11, in order to

visualize the mining technique, the axes that correspond to a query is generated as user

request (Col. 14, line 57-Col. 16, line 3). Assuming the user entered `module`,

`fuselage`, and `pounds` as choices for the positive direction of the axes (Col. 18, lines

11-27), a legend is generated for the axes. The legend consists of one or more words

attached to one or both directions of the dimension. This indicates to the user that

documents near one end of the dimension tend to contain the words at that end or

words correlated with those words in the document set (Col. 15, lines 52-59). As shown

in FIG. 20 is example of visualization with a plurality of projected points corresponding

to documents with three rays *module, fuselage*, and *pounds* having a common

origin, and corresponding to the queries, wherein the documents near the end of the ray

tend to contain the query word based on the similarity as *relative relationships*

determined by measuring the distance between the query and the documents. In other

words, the technique as discussed performs the claimed *control an image device to depict*

points corresponding to data from the database along each of a plurality of rays, wherein

positions of the displayed points correspond to the relative relationships, wherein the computer

usable code configured to display includes computer usable code configured to display at least

a majority of the plurality of rays to have a common origin. Billheimer does not explicitly

teach the technique of *displaying the plurality of ray as radiating outwardly from the*

common origin at equally space angle from one another. However, as disclosed by

Billheimer, information visualization is to ensure that the dimensions are orthogonalized

if the user desires. Returning to FIG. 20, the three rays *module, fuselage*, and

pounds are chosen for the positive direction will be orthogonalized. And by

orthogonalizing, obviously, the three rays are intersected at the right angle at the

common origin, and *radiated outwardly from the common origin at equally space angle from*

one another. It would have been obvious for one of ordinary skill in the art at the time the

invention was made to modify the Billheimer technique by using the orthogonal

technique to radiate outwardly the rays in order to represent a result of two different

query terms contain in the same document.

Regarding to claims 2, 18, 34 and 50, Billheimer teaches all the claim subject

matters as discussed in claims 1, 17 and 49, Billheimer further discloses the step of

placing a small graphic entity at an end of each of the plurality of rays to represent a

respective one of the plurality of query objects (FIG. 20).

Regarding to claims 3 and 19, Billheimer teaches all the claim subject matters as

discussed in claims 1 and 17, Billheimer further discloses the step of *locating the*

plurality of rays to have a common origin (FIG. 20).

Regarding to claims 4, 20 and 36, Billheimer teaches all the claim subject

matters as discussed in claims 3, 19 and 33, Billheimer does not explicitly discloses the

step of *locating the plurality of rays to radiate outwardly from the common origin at*

equally-spaced angles from one another. However, as disclosed by Billheimer, information

visualization is to ensure that the dimensions are orthogonalized if the user desires.

Returning to FIG. 20, the three rays module, fuselage, and pounds are chosen for

the positive direction will be orthogonalized at the common origin. And by

orthogonalizing, obviously, the three rays are intersected at the right angle at the

common origin, and *located the rays to radiate outwardly from the common origin at equally*

space angle from one another. It would have been obvious for one of ordinary skill in the

art at the time the invention was made to modify the Billheimer technique by using the

orthogonal technique to locate the ray to radiate outwardly in order to represent a result

of two different query terms contain in the same document.

Regarding to claims 6, 22, 38 and 54, Billheimer teaches all the claim subject

matters as discussed in claims 5, 21, 37 and 53, but fails to disclose the step of

adjusting the critical distance in response to user input. However, as illustrated by

Billheimer, if a user enters `module`, `fuselage`, and `pounds` as choices for the positive

direction of the axes (Col. 18, lines 11-27), the scatterplot visualization as in FIG. 20 will

be display. And obviously, if the user enters another terms for querying, the distance will

be adjusted according to the cosine measure (Col. 14, lines 10-29). Therefore, it would

have been obvious for one of ordinary skill in the art at the time the invention was made

to modify the Billheimer method by including the step of adjusting the critical distance in

order to visualize the result of a query.

Regarding to claims 7, 23, 39 and 55, Billheimer teaches all the claim subject

matters as discussed in claims 1, 17, 33 and 49, Billheimer does not disclose the step of

re-determining relative relationships between each of the plurality of query objects and the

body of data in response to user input; and rearranging the positions of the displayed points in

response to re-determining. However, as illustrated by Billheimer, if a user enters

`module`, `fuselage`, and `pounds` as choices for the positive direction of the axes (Col.

18, lines 11-27), the scatterplot visualization as in FIG. 20 will be display. And obviously,

if the user enters another terms for querying, the relative relationship will be re-

determine and the position will be rearranging according to the cosine measure (Col.

14, lines 10-29). Therefore, it would have been obvious for one of ordinary skill in the art

at the time the invention was made to modify the Billheimer method by including the

step of re-determining and rearranging in order to visualize the result of a query.

Regarding to claims 8, 24, 40 and 56, Billheimer teaches all the claimed subject

matters as discussed in claims 1, 17, 39 and 49, Billheimer does not explicitly teach the

step of *deleting an element from the body of data in response to user input; re-determining*

relative relationships between each of the plurality of query objects and the body of data in

response to deleting; and rearranging the positions of the displayed points in response to

re-determining. However, in a document database, a document could be added into or

deleted from the database, and obviously, when a document is deleted from the

database, for example, any document of FIG. 17, the matrix represents the relationships

between the query and the document will be changed, also as in FIG. 20. Therefore, it

would have been obvious for one of ordinary skill in the art at the time the invention was

made to modify the Billheimer system and method by including the step of deleting and

rearranging in order to add in or delete a document from the document database.

Regarding to claims 9, 25, 41 and 57, Billheimer teaches all the claim subject

matters as discussed in claims 1, 17, 33 and 49, Billheimer further discloses the step of

accessing data corresponding to the occurrence of textual information within a plurality of

documents and displaying comprises depicting usage of the textual information within the documents corresponding to portions of the plurality of query objects (Col. 15, lines 52-Col. 16).

Regarding to claims 11, 27, 43 and 62, Billheimer teaches all the claim subject matters as discussed in claims 1, 17, 33 and 49, Billheimer further discloses the step of representing each of the plurality of query objects and each datum in the body of data as an n-dimensional vector in an n-dimensional vector space (FIG. 20).

Regarding to claims 12, 28, 44 and 63, Billheimer teaches all the claim subject matters as discussed in claims 11, 27, 43 and 62, Billheimer further discloses the step of calculating a similarity measure between each of the plurality of query objects and each datum of the body of data using some portion of the n-dimensional vectors (Col. 14, lines 10-34).

Regarding to claims 14, 30, 46 and 59, Billheimer teaches all the claim subject matters as discussed in claims 1, 17, 33 and 49, Billheimer further discloses the step of displaying points corresponding to data from the database along each of the plurality of rays in a two dimensional display, wherein positions of the displayed points correspond to the relative relationships (Col. 15, lines 20-51).

Regarding to claims 16, 32, 48 and 61, Billheimer teaches all the claim subject

matters as discussed in claims 1, 17, 33 and 49, Billheimer further discloses the step of

breaking elements into subelements; determining relative relationships between each of the

plurality of query objects and the subelements; and displaying points corresponding to the

subelements along each of the plurality of rays, wherein positions of the displayed points

correspond to the relative relationships (Col. 10, lines 6-65).

4.   **Claims 15, 31, 47 and 60 are rejected under 35 U.S.C. 103(a) as being**

unpatentable over Billheimer et al. [USP 6,611,825 B1] in view of Hazlehust et al.

[USP 6,289,353].

Regarding to claims 15, 31, 47 and 60, Billheimer teaches all the claimed subject

matters as discussed in claim 1, 17, 33 and 49, Billheimer fails to teach the step of

determining thematic boundaries within each element contained in the database; breaking

elements into subelements at the determined thematic boundaries; determining relative

relationships between each of the plurality of query objects and the subelements; and

displaying points corresponding to the subelements along each of the plurality of rays,

wherein positions of the displayed points correspond to the relative relationships. Hazlehust

teaches a method and system for retrieving information by producing a vector space for

documents. Hazlehust further discloses the step of *determining thematic boundaries*

within each element contained in the database; breaking elements into subelements at the

determined thematic boundaries; determining relative relationships between each of the

plurality of query objects and the subelements (Hazlehust, Col. 4, line 50-Col. 6, line 17). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Billheimer method and system by determining a thematic boundaries as taught by Hazlehust and displaying the result of a query as in Billheimer FIG. 20 in order to categorize a document database for querying.

5.   **Claims 5, 21, 37, 53, 65, 67-68 and 71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Billheimer et al. [USP 6,611,825 B1] in view of Herz [USP 6,460,036 B1].**

Regarding to claims 5, 21, 37 and 53, Billheimer teaches all the claim subject matters as discussed in claims 1, 17, 33 and 49, Billheimer further discloses the step of *displaying includes locating the plurality of rays to have a common origin and further comprising determining a critical distance from the common origin* (Billheimer, FIG. 20, Col. 15, lines 52-Col. 16, line 3; Col. 17, lines 24-41). Billheimer fails to disclose the claimed *points on the plurality of rays falling within the critical distance meet or exceed a relevancy threshold and points on the plurality of rays outside the critical distance do not meet the relevancy threshold*, although as in FIG. 18 is the score to determine the results. Herz teaches a method of clustering target objects. Herz further discloses a threshold distance t for displaying the most interesting objects, wherein t is chosen to be a function of cluster diameter of a cluster C (Herz, Col. 68, lines 36-56). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was

made to modify the Billheimer method and system by applying a threshold as taught by

Herz to specify the distance a result document with a query, and by applying the

threshold, the displaying of a query's result will be easy to distinguish the closet

document that matches with a query.

Regarding to claim 65, Billheimer teaches a method, a system, and computer

readable medium for representing a document collection (Billheimer, Col. 4, lines 35-

48). As shown in FIG. 2 is *a data processor* (Billheimer, Col. 8, line 49-Col. 9, line 6). As

shown in FIG. 9, a query can be treated as a document, and projected into the same

subspace. A query frequency vector is computed by tokenizing the query and applying

the same term normalization and stemming policies that were used on the original

collection (Billheimer, Col. 14, lines 10-14). This performs the claimed *inputting a*

plurality of query objects into a data processor. The logic then moves to block 226 where

the similarity is determined by measuring the distance between the query and the

documents by using the cosine (Billheimer, Col. 14, lines 28-31) as the step of

determining relative relationships between each of the plurality of query objects and a body of

data. The top ranked documents in terms of closeness are then returned as best

matches to the query (Billheimer, Col. 14, lines 31-34). As shown in FIG. 11, in order to

visualize the mining technique, the axes that correspond to a query is generated as user

request (Billheimer, Col. 14, line 57-Col. 16, line 3). Assuming the user entered

module, *fuselage*, and *pounds* as choices for the positive direction of the axes

(Billheimer, Col. 18, lines 11-27), the scatterplot visualization as in FIG. 20 performs the

claimed *displaying a point along a plurality of rays for each of the plurality of query objects, wherein positions of the displayed points correspond to the relative relationships between a respective one of the plurality of query objects and the body of data,* each axe is identified by a query such as `module, fuselage,` or `pounds` as *a small graphic entity at an end of each of the plurality of rays to represent a respective one of the plurality of query objects.* Billheimer further discloses the step of *determining a critical distance from the common origin* (Col. 14, lines 10-34). Billheimer does not explicitly teach the technique of *displaying the plurality of rays to have a common origin and to radiate outwardly from the common origin at equally-spaced angles from one another,* and fails to teach *points on the plurality of rays falling within the critical distance meet or exceed a relevancy threshold and points on the plurality of rays outside the critical distance do not meet the relevancy threshold,* although as in FIG. 18 is the score to determine the results. However, as disclosed by Billheimer, information visualization is to ensure that the dimensions are orthogonalized if the user desires. Returning to FIG. 20, the three rays `module, fuselage,` and `pounds` are chosen for the positive direction will be orthogonalized. And by orthogonalizing, obviously, the three axes as rays are intersected at the right angle at the *common origin,* and *radiated outwardly from the common origin at equally space angle from one another.* Herz teaches a method of clustering target objects. Herz further discloses a threshold distance t for displaying the most interesting objects, wherein t is chosen to be a function of cluster diameter of a cluster C (Herz, Col. 68, lines 36-56). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Billheimer method and system by applying a

threshold as taught by Herz to specify the distance a result document with a query, and

by applying the threshold, the displaying of a query's result will be narrow down to the

closet document that matches with a query.

Regarding to claim 67, Billheimer and Herz teaches all the claimed subject

matters as discussed in claim 65, Billheimer further discloses the step of *determining*

relative relationships between each of the plurality of query objects and a body of data stored

in a database in the data processor (Billheimer, Col. 14, lines 10-14).

Regarding to claim 68, Billheimer and Herz teaches all the claimed subject

matters as discussed in claim 65, but does not explicitly disclose the step of *adjusting*

the critical distance in response to user input. However, as illustrated by Billheimer, if a

user enters `module`, `fuselage`, and `pounds` as choices for the positive direction of the

axes (Col. 18, lines 11-27), the scatterplot visualization as in FIG. 20 will be display.

And obviously, if the user enters another terms for querying, the distance will be

adjusted according to the cosine measure (Col. 14, lines 10-29). Therefore, it would

have been obvious for one of ordinary skill in the art at the time the invention was made

to modify the Billheimer method by including the step of adjusting the critical distance in

order to visualize the result of a query.

Regarding to claim 71, Billheimer and Herz teaches all the claimed subject

matters as discussed in claim 65, but does not explicitly discloses the step of

determining a critical distance from the common origin, wherein points on the plurality of

rays falling within the critical distance meet or exceed a relevancy threshold and points on the

plurality of rays outside the critical distance do not meet the relevancy threshold.

6.   **Claims 10, 13, 26, 29, 42, 45, 58 and 64 are rejected under 35 U.S.C.
103(a) as being unpatentable over Billheimer et al. [USP 6,611,825 B1] in view of
Leivian et al [USP 5,897,627].**

Regarding to claims 10, 26, 42 and 58, Billheimer teaches all the claimed subject

matters as discussed in claims 1, 17, 33 and 49, Billheimer further discloses the step of

organizing data in the database and the plurality of query objects in an n dimensional space

(FIG. 20). Billheimer fails to teach the step of *reducing a number n of dimensions in which*

the data in the database and the plurality of query objects are organized to two dimensions

using a Sammon projection. However, Sammon is a nonlinear projection method to map

a high dimensional space onto a space of lower dimensionality as taught by Leivian

(Leivian, Col. 3, lines 5-67). Therefore, it would have been obvious for one of ordinary

skill in the art at the time the invention was made to modify the Billheimer method and

system by using the Sammon method as taught by Leivian to map a high dimensional

space to a lower dimensionality in order to give more option of displaying to a user.

Regarding to claim 13, 29, 45 and 64, Billheimer teaches all the claimed subject

matters as discussed in claims 12, 28, 44 and 63, Billheimer further discloses *the*

similarity measures between each of the plurality of query objects and the body of data are

weighted more heavily than the similarity measures among data within the body of data; and

wherein displaying comprises displaying points corresponding to the plurality of query objects

and points corresponding to the body of data according to the three or fewer dimensions (FIG.

20, Col. 14, lines 10-34). Billheimer fails to teach the step of *reducing a number n of*

dimensions in which the body of data and the query objects are represented to three or fewer

dimensions using a multi-dimensional scaling method. Sammon is *a multi-dimensional*

scaling method to map a high dimensional space onto a space of lower dimensionality as

taught by Leivian (Leivian, Col. 3, lines 5-67). Therefore, it would have been obvious for

one of ordinary skill in the art at the time the invention was made to modify the

Billheimer method and system by using the Sammon method as taught by Leivian to

map a high dimensional space to a lower dimensionality in order to give more option of
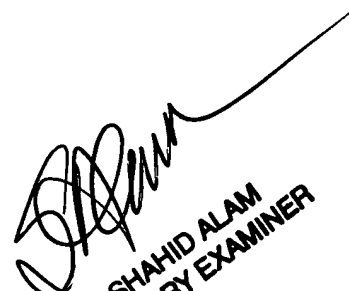
displaying to a user.

Conclusion

7.   Any inquiry concerning this communication or earlier communications from

the examiner should be directed to HUNG Q PHAM whose telephone number is 703-

605-4242. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, JOHN E BREENE can be reached on 703-305-9790. The fax phone

number for the organization where this application or proceeding is assigned is 703-

872-9306.

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Business Center (EBC) at 866-217-9197 (toll-free).

Examiner Hung Pham
April 13, 2004